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SCIENCE NEWS LETTER

TECHNOLOGY DEPT.

APR 1 1944

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 1, 1944



Flood Waters
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A SCIENCE SERVICE PUBLICATION

VOLCANOLOGY

Erupting Vesuvius

Far behind present combat line, but if activity of the ancient volcano had started earlier, it might have seriously handicapped American advance on Naples.

► **ERUPTING** Mt. Vesuvius, which on March 18 started its biggest show since 1906, will not affect the American activities in the Italian campaign, as the combat area is some 70 miles to the north, and relatively few troops are probably in the Vesuvius neighborhood. The damages so far reported are on the volcano's slopes, where American troops earlier in the campaign met bitter German resistance.

This ancient volcano within plain sight to the south of Naples, which has taken heavy toll in lives and property in the past 2,000 years, stood directly on the path which the Allied Armies had to follow from the south on their way to Naples. The routes to the north run on both sides along the mountain slopes, which extend toward the west almost to the shore of Tyrrhenian sea. Vesuvius helped temporarily hold the advancing Americans.

Vesuvius forms the southeast extremity of a highly volcanic area which extends into the arena of present fighting, but for over three centuries has been the only active crater in the district. Vesuvius is almost continuously active, but with a harmless action emitting smoke, steam and other gases, together with ash dust.

The first recorded eruption of Vesuvius was in 79 A. D., when Titus ruled Rome. It was at that time that Pompeii, Herculaneum and other places of lesser importance were buried in ashes with tremendous loss of life. Seven important eruptions are recorded between then and 1500.

For 131 years the volcano was then quiet and the crater became a famous grazing area. In 1631 came a terrific eruption, causing the death of perhaps 18,000 persons. Many eruptions of noteworthy importance occurred during the next 275 years.

Then came the great outbreak of 1906, one of the greatest eruptions on record. It completely altered the shape and height of the cone. In 1913, 1927 and 1929 were further activities important enough to attract world-wide attention.

The present outbreak, according to reports, puts all of these since 1906 in the shade. However, though dwarfing

the destructive fury of bombs and guns being loosed only a few score miles to the northwest, actually it is a rather feeble effort as volcanic activity goes, from the long-range geological point of view. Outbursts of the type that have characterized the whole known history of the famous volcano represent a stage of declining reserves in the reservoir of molten rock and heat energy deep within the crust of the earth.

There are three main stages in a volcanic cycle, geologists explain. The first, which no man has ever seen, is a vast, flood-like but unexplosive outflow of lava from networks of open cracks in the earth, covering thousands of square miles. Such lava fields are typically developed in our own Pacific Northwest.

The second stage, far less extensive than the first, is a continued outpouring of lava, but from single points only, and still mainly quiet. This forms volcanoes of huge size, but so low that they are hardly recognizable as mountains. They have been given the name of "shield volcanoes," in contrast to the great conical cinder-heaps that we usually think of when the name volcano is mentioned. Our own Kilauea, in the Hawaiian islands, is a typical shield volcano.

As the subterranean source of lava and heat-energy becomes still further depleted, we have formation of conical piles consisting of alternating layers of solid lava and fragmented material ranging from fine, ash-like dust to huge, bomb-like lumps of cooled and solidified rock. Because of this layering, such mountains are called "strato-volcanoes." Vesuvius and Etna are typical of this class.

Last stages in the dying-out of underground heat-sources no longer produce eruptions of solid materials, but simply the blowing of steam and other hot gases through vents known as fumaroles, solfataras, geysers and hot springs, such as we have in abundance in Yellowstone National Park.

The magma, or thick, viscid, porridge-like material from which a volcano gets both its supply of spouting, explosive gases and its stock of lava to pour down its slopes or blow high into

the air as dust, pebble-like "lapilli" and larger volcanic "bombs," is no longer believed by scientists to be stuff squeezed out from the middle of the earth. It is held to be of more or less local origin, probably reduced from an originally solid, cold state by the friction and pressure attending the enormous, slow bendings and pushings involved in the wrinkling of the earth's crust into mountain chains and ocean deeps.

The "fire" of a volcano is mainly the glow from the lava in its throat, reflected from clouds over the peak. There can, however, be real fire in a volcano, for some of the gases that spurt forth are combustible: hydrogen, methane and hydrogen disulfide. However, by far the larger part of a volcano's explosive energy is delivered in the form of expanding steam.

It is steam, and the expansive energy of other heated gases like carbon dioxide and sulfur dioxide, that blow part of the lava into the air, bursting it into fragments of all sizes. The largest fall near the volcano as dangerous missiles, like the plunging fire of mortar batteries. Finer bits are carried by the force of the explosion and by winds of the stratosphere to greater distances, depositing thick layers of ash on fields and cities scores of miles away. The finest fragments, microscopic in size and impalpable to ordinary means of detection, are sometimes carried high into the stratosphere, to drift for weeks, or even for two or three years, as disturbers of normal climates and causes of gorgeous red sunsets.

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ZOOLOGY

Coyote Seen Running With Deer in Pursuit

► A VARIANT of the "man bites dog" story was found in nature recently. Charles Vest of the Wyoming Fish and Wildlife Service reports seeing a big male coyote running at top speed with a buck deer in hot pursuit. When the deer caught up with the coyote, he knocked it down with his forefeet, then jumped on it.

After taking a hard pounding, the coyote managed to crawl into a brush patch which the deer circled until he saw Mr. Vest. Then he dashed away, followed by three does that had been waiting at a distance.

The coyote was so badly trampled that he could hardly crawl, and Mr. Vest easily put an end to him.

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MEDICINE

Penicillin for Cancer

Mold chemical kills cancer cells without harming normal cells. Experiments so far are in the test-tube stage only, research scientists warn.

► **TEST-TUBE** experiments putting penicillin in the role of a possible weapon against cancer are announced. (*Science*, March 24).

The experiments were performed at the Wistar Institute of Anatomy and Biology, Philadelphia, by William Ivor Cornman, who is now a corporal, or technician fifth grade, working in the laboratory of Walter Reed Hospital.

Penicillin, Corporal Cornman found, will kill mouse and rat bone cancer cells while leaving unharmed normal cells growing by their side in culture tubes outside the animal body.

After the penicillin treatment the tumors were implanted into rats of a 100% cancer susceptible strain. All tumor cultures on which penicillin had produced lethal damage and most of those on

which it had produced marked damage failed to produce tumors in the susceptible rats. Cultures not treated with penicillin all produced tumors when implanted into the rats.

This selective killing action of penicillin against one kind of cancer cell without damage to surrounding normal cells seems to be just what cancer specialists have long been looking for. However, Dr. M. R. Lewis and Dr. W. H. Lewis, famed wife-and-husband team under whose direction Corporal Cornman's studies were made at the Wistar Institute, warn that the experiments were of the test-tube variety only and that successful trials in animals will be necessary before any hope of penicillin being a cancer cure can be justified.

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MEDICINE

May Induce Cancer

Pituitary gland as well as ovarian hormones may be involved in breast cancer, experiments of transplanting various glands in mice indicate.

► **NEW EVIDENCE** of the importance in cancer development of factors which stimulate growth is reported by Dr. Leo Loeb, Dr. H. T. Blumenthal and Marian Moskop Kirtz, of Washington University School of Medicine. (*Science*, March 24)

Into hundreds of mice, these scientists transplanted various glands or combinations of glands from other mice. Some got transplants of ovaries only. Others got transplants of the forepart of the pituitary gland, the tiny gland in the head which produces many powerful hormones, including a growth-stimulating hormone. Still other mice got transplants of both ovaries and pituitaries.

Pituitary hormones as well as ovarian hormones, they found, would induce development of breast cancer in some of the mice. The pituitary gland transplants seemed to exert their effects on breast tissue by way of the ovaries. These glands, under the additional stimulus of the pituitary transplants, prob-

ably produce larger amounts of their own estrogenic hormones than they would otherwise do, the scientists suggest.

They conclude that "all those hormones or other factors which stimulate growth processes in an organ or tissue may thereby also affect the production of cancer."

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METALLURGY

Wartime Wire Fencing May Not Be Durable

► **THAT** the life of galvanized wire fencing depends on the thickness of the zinc coating has been proved by a series of tests just concluded at Cornell University. The zinc wears off at a regular rate.

The thinner the coating, the sooner the steel is exposed and rusting begins, causing the fencing to become brittle and weak.



WELL-FROSTED — This airplane generator has, in effect, been to 70,000 feet altitude. In the testing chamber of the Westinghouse Electric & Manufacturing Co. electrical equipment for planes can be subjected to a simulated take-off from a hot, steaming landing strip in a jungle, and climb at the normal rate to the cold, rarefied air of the stratosphere.

As one result of the tests, University authorities are of the opinion that farmers need an "open formula" for galvanized wire fencing, to tell them just how much zinc is used in coating it.

Tests of 840 samples of fencing material, including much woven wire and barbed wire, have been under way at the University College of Agriculture for seven years, says Prof. Burt A. Jennings. The work is in cooperation with the American Society for Testing Materials.

Galvanized wire samples under test at Cornell have weights of zinc coating from two-tenths of an ounce per square foot to two ounces per square foot of wire surface. Rust never attacks the wire until nearly all the zinc has worn away. The wire with the light coating of zinc may rust within two years, some of the heavily coated wire may be used for 20 to 25 years before it rusts.

Since zinc is now a scarce war material, the government has reduced the amount available to coat wire fencing. Farmers, it is pointed out, should at present buy no more fencing than is absolutely necessary, because it will have an extremely short life.

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PUBLIC HEALTH

Checking Spread of V. D.

A plan that will help prevent venereal disease from becoming widespread as a result of the return of soldiers from war is announced by Dr. Parran.

► **MALARIA** and other tropical diseases may be spread through this country by returning troops as they re-enter civilian life but the spread of syphilis which so often follows the return of soldiers from war will be checked.

A joint Army-Public Health Service plan to accomplish this was announced by Surgeon General Thomas Parran at the conference of state and territorial health officers in Washington.

Every soldier at the time of his demobilization, according to this plan, will be given a blood test. If he has syphilis, he will be treated by the Army until he is non-infectious before he is discharged. After discharge, treatment will be continued if necessary.

State health departments will play an important part in this coordinated program, Dr. Parran said.

The entire approach to the treatment of syphilis and gonorrhea may be altered by the discovery that penicillin may prove a cure for syphilis as it is for gonorrhea, Dr. Parran pointed out.

The number of Rapid Treatment Centers has increased from 13 to 47 in the past year. These centers with a bed-capacity of 6,100 are now serving 20 states, the District of Columbia, Panama, Puerto Rico and the Virgin Islands.

Of the estimated 200,000 new cases of syphilis per year, three-fourths are now being treated by private physicians, in public clinics and the military medical services. The remaining 50,000 could be cured or made non-infectious, Dr. Parran said, if five infectious cases can be found and brought to the centers for treatment for every one now treated.

Health officers were urged to swifter action to reassess and make known the needs of their communities for physicians and dentists so that the relocations provided for by the existing law can be accomplished promptly.

"Often action is slowest in the very communities where needs are greatest," Dr. Parran declared.

The supply of available personnel for health departments will continue to diminish as the demands of the armed forces and war industries increase, Dr. Parran warned. He urged health de-

partments to follow the Public Health Service's policy of recruiting available personnel and conducting a program of in-service training for them to make up for the lack of professionally trained men and women.

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Typhus Fever Threat

► **TYPHUS FEVER**, known to Americans chiefly through war correspondents' reports from Italy and North Africa, is a serious threat to health and manpower in the United States, it appears from the report of Dr. C. R. Eskey, medical director, U. S. Public Health Service, to the Conference of State and Territorial Health Officers in Washington.

Cases have increased sharply in the last five years and, unless the disease is checked, "will reach appalling figures," Dr. Eskey declared.

The disease "ranks first among all diseases as a cause of adult disability in the southern part of this country," he stated.

Typhus fever in the United States is a much milder disease than the European variety and seldom kills its victims. They are, however, completely disabled for work for an average of two months, a recent analysis of over 150 reported cases shows.

A total of 4,473 cases of typhus were reported in the United States during 1943. Probably not even half the cases treated by physicians are reported, however. Dr. Eskey, who is in charge of the typhus control unit of the U. S. Public Health Service, with headquarters in Atlanta, Ga., estimates that more than 10,000 cases actually occurred in the southern states during 1943.

In the last five years, 75% more cases were reported than during the preceding five years, Dr. Eskey said. Cases have been reported from 33 states and the District of Columbia, but 97% of all cases reported in the last five years occurred in the southern endemic area.

States in this area are Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Lou-

isiana and Texas. Another focus of infection exists in California, while Arkansas and Oklahoma have been reporting enough cases in recent years to warrant inclusion in the southern endemic area.

The typhus fever we have in this country is spread by rats and rat fleas. It is not necessary, however, to be bitten by an infected rat flea to get the disease. The germs are discharged in the body wastes or excreta of both rats and rat fleas. These germs may then be inhaled in dust, may get on hands and fingers or on food prepared for human consumption.

Two outbreaks of typhus fever, one in an Army camp, were traced to cat-

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ing places where infected food was probably the source of the trouble.

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Tropical Diseases

► **THE DANGER** that exotic tropical diseases will be spread widely through this country by returning service men is not great, Dr. R. E. Dyer, director of the National Institute of Health, U. S. Public Health Service, told state and territorial health officers at their conference in Washington.

Besides malaria, our troops serving in the tropics are exposed to trypanosomiasis, one form of which is the deadly African sleeping sickness; leishmaniasis; schistosomiasis; and filariasis.

Malaria and filariasis, however, are the only two over which health officers in the U. S. need be concerned, Dr. Dyer said. While malaria is endemic, that is, always present, in certain parts of the South and a few other places, there probably will be opportunity for the temporary spread of the disease in other areas through the return of infected service men.

Malaria and filariasis probably will not become a public health problem in this country through the establishment of foci or centers of infection. It is important, however, for physicians to watch

for signs of infection in discharged troops, Dr. Dyer warned, so that proper treatment of the infected persons can be instituted.

Few American physicians except those now serving with the forces in the tropics have ever seen a case of filariasis, and many physicians are not familiar with malaria. They may, therefore, mistake these diseases for other conditions and suitable treatment may not be given and suitable precautions against spread of the diseases may not be taken.

The danger of filariasis ever becoming established in this country is slight, Dr. Dyer believes. Small foci of infection in areas where it has not previously existed may develop after the return of service men who have the larval worms in their blood and are bitten by the kinds of mosquitoes that transmit the parasites.

These foci will die out, Dr. Dyer believes, just as the one in Charleston, S. C., has. Filariasis existed there for 150 years without ever becoming established in other parts of the country, he pointed out.

While opportunities for the establishment of these exotic diseases are distinctly limited, Dr. Dyer cautioned health officers to be alert to the possibility and to be prepared to undertake measures for their control.

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MEDICINE

Preventing Infant Deaths

Hope raised by research that way may be found to keep Rh blood factor from causing childless marriages. Factor present in 85% of white individuals.

► **NEW HOPE** that science may some day develop a way of preventing one of the most serious causes of infant deaths and childless marriages is provided in a report by Dr. Alexander S. Wiener, Miss Eve B. Sonn and Mrs. Ruth B. Belkin, of the Office of the Chief Medical Examiner, New York City (*Journal of Experimental Medicine*, March 1)

The hopeful suggestion, which may some day prevent countless family tragedies, comes as a result of studies of a factor only recently discovered in human blood, called the Rh factor. (See SNL, Nov. 27, 1943) The distribution of this blood factor seems to differ in different human races, but in the white race it is present in the blood of about 85% of individuals.

The Rh factor is harmless in itself,

but if blood containing the Rh factor is mingled with blood not containing it, then serious difficulties may arise. Dr. Wiener believes that the person lacking Rh may become sensitized to the Rh blood factor in a way similar to that in which some persons are allergic to ragweed pollen. A way may be found, Dr. Wiener hopes, to desensitize such persons just as hayfever patients are desensitized by injections of the materials to which they are sensitive.

If a mother has blood not containing Rh and her unborn baby has inherited the Rh factor from the father, then anti-Rh antibodies may be built up in the blood of the mother that may result in the sickness or death of this baby and any Rh-positive babies resulting later from the same marriage.

About one in 50 of the mothers lacking Rh become thus sensitized to Rh when they carry a baby with the Rh blood, Dr. Wiener has found. In case such a sensitized mother should be given a blood transfusion containing Rh blood, the mother would be in serious danger and might die. Many such double tragedies of mother and infant deaths occurred before the Rh blood factor was known, it is believed. Now Rh-negative blood is used in such a case.

At present, no way is known to prevent the sickness or death of the unfortunate babies who have Rh fathers and Rh-negative mothers. But, Dr. Wiener believes, the possibility exists that some method may be developed for desensitizing mothers so that the baby may be saved. Research based on this hope has already been started with the aid of a grant from the United Hospital fund.

Study of the blood of 97 families with 275 children and 135 mother-child combinations, reported by Dr. Wiener and his associates in the *Journal of Experimental Medicine*, confirms the theory previously developed that the Rh factor



AIR WAVES—The part these two WAVES are playing, in manning the shore jobs so that men can be released for the fighting fronts, is a highly technical one. The aerographer's mate (left) is loosing a pilot balloon at the Naval Air Station, Anacostia, D. C., while the officer aerologist (right) prepares to follow the path of the balloon with a theodolite. Their study of atmospheric conditions is essential for maintenance of an air station. Official U. S. Navy photo.

is not a single factor but actually a series of eight possible Rh types, of which seven have now been found. A person with one of these Rh types may become sensitive to another Rh type, Dr. Wiener's studies indicate.

Use of tests for these seven known Rh types would increase the accuracy of investigations of disputed parentage or

the identification of blood in criminal cases. With all these Rh types plus the more familiar blood types, there are altogether 126 different possible blood types. With this improvement in blood tests, a falsely accused man in a disputed parentage case now has a 40% chance of proving his innocence, Dr. Wiener says.

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MEDICINE

Hospital Train Trip

Wounded soldiers from overseas are speeded to hospitals near own home towns on "ward on wheels," where rank does not count and Army doctor is boss.

By WATSON DAVIS and JANE STAFFORD

► WHEN Johnny comes rolling home, sick or wounded, from the fighting fronts, he travels in pretty grand style in a hospital on wheels, with nurses, ward attendants, gray ladies of the Red Cross, surgeons and all the trimmings.

The press by Army invitation joined one of the regular exoduses from Halloran General Hospital, Staten Island, now a routine and efficient railroad operation, that puts the boys from overseas into hospitals nearer their own home towns and their families.

Most of the 185 men and 12 officers who were patients on the hospital train had arrived within a fortnight from the overseas theaters of war, England, Italy and North Africa—and at least one from New Guinea. He was a colored boy from Georgia, glad to get going south again, because someone had routed him to Halloran near New York City presumably with the idea that New York was close to Georgia! This lad from Georgia has a busted arm, and its cast was covered with more signatures than on a world series' baseball and decorated with several large red hearts of the Valentine pattern.

There was no need of distributing

to the boys on this train that pamphlet on race that there is such a stew about, because the mere matter of skin color is ignored on a hospital train in a good G. I. way. But to get back to the train—

There are special hospital cars in which the patients sit and sleep, much as they would in a hospital ward. A few ambulatory patients that were not traveling overnight sat up in regular Pullmans, but most of the patients were in these special cars with regular Army beds, an upper and a lower, especially built in. There is no more privacy than there is in the Army generally, and there are card games going all over the place, a phonograph "shoo-shooing" or "Oh, Johnnying" and plenty of smokes and candy presented by the Chaplains' Corps at the hospital the men had just left.

Smoking is permitted except at night after lights out, and cigarettes and occasionally cigars seem to be good ammunition in the fight to get our wounded and sick back to health for further service at home or possibly in the war.

Most of the patients in this train were probably through with the war for one reason or another. Some of them were NP's (neuropsychiatric cases), those whose nerves had given way under the unusual stress of Army service. This happens far behind the fighting fronts in many cases, and being an NP in the Army does not necessarily mean that the soldier when discharged to civilian life will not make good in his old job or a new one.

The patients, many of them, did not look very sick. There were no gruesome cases. A gunner of a Flying Fortress who had a bad dose of flak in his right leg, a few bad backs, a few flushed faces, that was about all. Some more seriously wounded are returning, but they were not on this train.

Many of the youngsters we talked to had been across for nearly two years. They were all glad to be getting nearer home, but one or two were beginning to wish they could go on with the fight with the outfits they had left.

The rolling hospital is equipped for anything but usually little happens that is medically serious. There is a little emergency operating room at the end of every other car or so, but the most that happens there is an abscess opened or a dressing changed. If there should be need of a major operation, the train would simply stop and the patient would be shifted swiftly to a private or Army hospital somewhere en route.



FROM OVERSEAS—Army Medical Corpsmen and medical officers stand by as a wounded soldier is lifted onto one of the hospital ward cars at Staten Island, N. Y. This particular train proceeded from Halloran General Hospital to other hospitals in the East and South, leaving soldiers as near their home towns as possible, U. S. Signal Corps photograph.

The men eat well. Food is good medicine. This train uses regular railroad diners, although there are a few special hospital kitchen cars manned by Army cooks on some of the other hospital trains. Any civilian on a Pullman would have felt at home, except he would have eaten what was put before him, as is the Army way.

An Army doctor is the boss of the train. Because the train we were on was to be split up into several sections, each going its way, there were surgeons in charge of each section, each a captain. Rank does not give an officer patient any right to act any differently from a private who is a patient. The medical corps officer issues the orders, for conduct of his hospital as well as medicines and treatments. It is an old Army custom, of course.

Bedtime comes early on a rolling hospital, about 9 p.m., and most of the patients are quite willing to snuggle down in their beds of fresh white linen

and sturdy OD blankets. As a "good-night" routine, the train commander takes his stethoscope and makes his rounds, just as he would in a regular hospital.

To the nurse at his side writing orders, he says "sodium amytal" for this soldier to insure a good night's sleep, a bit of codeine here for pain, keep your eye on this fellow as the thermometer shows he has a little temperature, and so it goes.

The hospital on wheels settles down for the night and the railroad's crack engineers keep the train moving not too fast, a mere 35 and 40 miles an hour, with special attention to stops and starts that might jar that battle wound. No fears now, and home and home folks to look forward to. Not a bad war after all.

The reporters who had intruded drop off unobtrusively and let the docs help the G.I.'s get on with their important business of getting well.

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HOSPITAL ON WHEELS—This picture shows soldier patients relaxing in their bunks on board one of the Army's "ward cars." U. S. Signal Corps photograph.

PSYCHOLOGY

Pilots Need Enemy

➤ **BEING READY** to fight and then not having a chance at the enemy in the air presents one of the greatest psychological hazards in the air was for our flying fighters, Dr. Walter R. Miles, Yale psychologist, told the Esso Research Club, a branch of the Society of Sigma Xi, in Elizabeth, N. J., in the first of a series of 25 Sigma Xi lectures he will deliver in coming weeks in all parts of the United States.

During long-range photographic reconnaissance, with no active fighting the "Gremlins" first made their appearance, Dr. Miles recalled. Long stretches of readiness, without combat service, are characteristic of military aviation and may present severe psychological stresses, he explained.

"Change of schedule in active flying service is also psychologically hazardous," Dr. Miles said. "Thus the cancellation of a bombing mission exacts an emotional cost which needs to be appraised and appropriately dealt with before the same crew is scheduled for its next operational duty."

"The practical psychological skill of the flight surgeon in appraising stress developed either from readiness or combat or from both, makes an important contribution to the efficiency of the air force in all such problems as these. If the psychological elements in the case

of a given military flyer can be properly appraised and skillfully directed by a flight surgeon, crew captain or other insightful guide, the chances are multiplied against 'his number coming up.'"

Dr. Miles told how psychologists and many other specialists are conducting research on many phases of military aviation to help the men in our fighting planes to achieve greatest effectiveness. Much of what is being learned and applied with success will be useful in developing air transportation of the post-war era, he predicted.

"In aviation the number of hours of training or flying have in the past served as a measure of learning progress or flight competence," Dr. Miles said in explaining one advance. "But clearly instruction, in terms of basic maneuvers and repetitions of these in practice, is obviously much more fundamental for learning than hours in the air as such, and other contributions to effective progress can come through the reinforcement to the practical experience in the air from prior mental rehearsal in which the whole routine is repeated again and again. Sport has long recognized this principle in the coaching of individuals and teams."

High altitude flying is one of the great problems of the present war and the adjustment of the human body and

mind to the reduced pressure of the atmosphere and low temperatures encountered can be studied, Dr. Miles explained, in a decompression chamber.

Vision presents many important psychological problems, Dr. Miles declared. One of these is peripheral vision or looking out the side of the eye which is necessary in landing of planes. The dark adaptation of the eyes must be protected from the lighting within the plane in night flying and the study of this problem has influenced selection of pilots and the development of new equipment and training methods.

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METEOROLOGY

Sunset Clouds Double As Rushing Flood Waters

See Front Cover

➤ **APRIL FOOL!** The picture on the cover of this SCIENCE NEWS LETTER is not of tumultuous flood waters at all! Turn the magazine upside down and you will see that it is actually a photograph of a lovely sunset. What appear to be reflections in the water are in reality the silhouettes of trees on the horizon.

This deluding photograph was taken near the Soldiers' Home in Washington, D. C., by Rev. John W. Baechle, of St. Joseph's College, Collegeville, Ind.

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ENGINEERING

New Ideas in Internal Combustion Engines

➤ TWO RADICAL departures from conventional structure are represented in two new patents on internal combustion engines. The first, invented by R. F. Harless of Ossining, N. Y., and covered by patent 2,344,865, is on a new method for transferring the heat from the cylinders of an engine to the liquid of the cooling system.

In the customary construction, the cooling liquid comes into direct contact with the cylinders, in hollow spaces that entirely surround them. This usually makes for poor circulation in spots, hence for uneven cooling. To obviate this difficulty, Mr. Harless packs the space around the cylinders with bronze wool, which is a good conductor, and in the wool he embeds a series of circulating coils containing the coolant.

The other engine, so radical a departure from convention that it would hardly be recognized as such, is the invention of Walter Conradt of Kenosha, Wis. Instead of having the customary cylindrical piston sliding up and down in a round cylinder, it has one piston shaped like a quarter of a pie, pivoted at the point. This rocks back and forth in a wide slot. Through a hole in this first piston slides a second, smaller piston, which is really only a rod; this one is connected to the crankshaft. Very high compression, with correspondingly high efficiency, is claimed by the inventor.

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PSYCHOLOGY

Lullabies and Play Needed by Infants

➤ BABIES need mothering, the good old-fashioned kind that goes with rocking and singing lullabies, says Dr. Margaret A. Ribble, of New York, in her newly published book, *The Rights of Infants* (Columbia University Press).

Many mothers seem to know how to mother their babies. Others seem to lack this knowledge or to have had it thwarted or perverted by some unhappy early experience of their own. Still others have it but are afraid to express it because of what Dr. Ribble would probably call faulty instruction in child care. These are the mothers who have been warned that too much handling or jiggling of the child will make him nervous, that too much attention will spoil

him and make him a problem child, that food and sleep are his most important needs and that his life must run on a schedule. Such mothers particularly will benefit from study of Dr. Ribble's book.

Proper food and rest are important. Schedules are useful, especially to the mother since they give her a chance to get her other work done and to get the rest she needs. They help the baby in many ways, too. But they should not frighten the mother into failing to be a complete mother to her baby.

Unwise attention does prolong dependency and spoil the child, Dr. Ribble states. But, she adds, mother love is a good deal like food and one does not deprive a child of food because he may get too much or the wrong kind.

The formula she gives for the baby's emotional feeding is "a little at a time, and frequently." These feedings should be given regularly, so that the baby expects them. A good way to give these small feedings of mother love regularly is to play with the baby a few minutes each time you pick him up to feed him his milk and other food. Bath time is another good opportunity for this loving play and fondling. Talk to him, but not scoldingly, when you change his diapers. Rock him a bit or hold him close in your arms and sing a short lullaby at bedtime.

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CHEMISTRY

New Resin Plastic Used As Hog Depilatory

➤ TRADITIONAL hog-scalding to remove the hair in butchering may soon be "out," replaced by a new scientific method. In the new process porkers are plasticized and peeled. The dead hog is submerged in a tank of liquid plastic, then pulled out coated with the sticky stuff. When properly cooled, the plastic is stripped off, taking all the hair with it. The process is quick, clean, thorough and economical.

The plastic used is a resin chemical. After being used on one hog it is remelted and used again and again. Bristles, whiskers, stubble and hairs are removed from the liquid before it is re-used. They are just as suitable for commercial uses as if they had been removed by the old scalding-scraping method. The new chemical shaving method, and the resin chemical used, were developed by the Hercules Powder Company.

Science News Letter, April 1, 1944

IN SCIENCE

INVENTION

Mosquito-Proof Clothing Uses Sponge Rubber

➤ MOSQUITOES are offered a feast of Tantalus by wearers of clothing fashioned from a new type of fabric, on which U. S. patent 2,344,811 has been issued to F. A. Gill of Chicago.

Mr. Gill had noticed how supposedly mosquito-proof clothing frequently fails to function when it lies directly upon the skin it is supposed to protect, permitting the pests to drill right through. He therefore devised a way to keep the insects at more than stinger's length by securing a close-meshed outer layer of netting over a foundation of criss-crossed strips of sponge rubber, felt or other material, thick enough to hold the netting away from the skin at all points.

A complete suit of the new material consists of trousers, close-fitting over the ankles of high shoes at the bottom, a jacket, similarly close-cuffed to gloves at the wrists, and a visored cap with all-round curtain protecting face and neck and tucking into the jacket collar. Slide fasteners permit rapid donning and removal, and there is a short slide-closed vent in front of the mouth.

Science News Letter, April 1, 1944

ARCHAEOLOGY

A. A. U. W. Confers Award On Woman Archaeologist

➤ THE \$2,500 achievement award of the American Association of University Women was conferred in New York City on March 24 on Dr. Gisela M. A. Richter, researcher in classical archaeology. Dr. Richter has made distinguished contributions to the field of Greek and Roman art through her writings, lectures and work as curator at the Metropolitan Museum of New York City.

This annual award, the gift of the Northwest Central Region of the Association, was established to give recognition to distinguished scholarly work by women. Dr. Florence Seibert, internationally famous for her research on the chemistry of tuberculosis, received the newly-established award last year.

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SCIENCE FIELDS

SOCIOLOGY

Drafting of Women Favored by A. A. U. W.

► DRAFTING of women for women's branches of the military services is favored by the American Association of University Women, provided the need for such draft exists and is demonstrated by the War and Navy Departments.

A majority of the association leaders reached by a poll voted in favor of drafting women, if necessary, under a Selective Service law. Because of the importance of the decision, a questionnaire pointing out that recruiting of women for the armed forces had fallen below the need was sent not only to members of the National Committees on Legislative Program and on Status of Women, but also to the National Board of Directors, state presidents and chairmen of the local committees.

"It is only consistent that the A. A. U. W. take this stand," stated Mrs. Frances Valiant Speck, secretary to the Committee on Economic and Legal Status of Women, "since the Association voted at the 1941 biennial convention 'continued support of the principle of equality for women,' the principle of equality being construed as meaning equality of responsibility as well as equality of rights."

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CHEMISTRY

Penicillin's Big Family Causes Much Confusion

► THE GROUP of germ-fighting chemicals, such as penicillin, produced by microorganisms themselves is growing so fast that even scientists working to discover new ones are having trouble keeping them straight, it appears from a report by Prof. Selman A. Waksman, of Rutgers University and the New Jersey Agricultural Experiment Station. (*Science*, March 17)

Part of the confusion comes from the fact that two groups of scientists, working in different institutions or even in different countries, will at about the same time discover an anti-germ chemical from the same microorganism. Each group of scientists gives the chemical it has discovered a different name. It

takes some time before further studies show that the two separately discovered substances are identical.

Confusing also is the fact that some of these microorganisms produce more than one germ-killing chemical. Top of the list in this respect, Prof. Waksman reports, is *Aspergillus fumigatus*, which can form four different anti-bacterial substances, spinulosin, fumigatin, fumigacin and gliotoxin.

Penicillium notatum, which produces penicillin, also forms another anti-bacterial substance which has been variously called the E. coli factor, penatin, notatin and penicillin B.

Still further confusion arises from the fact that the same type of anti-bacterial substance may be produced by several different microorganisms. Prof. Waksman gives six substances in this class, citrinin, penicillic acid, penicillin, gliotoxin, spinulosin and clavacin.

Some of these chemicals, although efficient weapons against germs, cannot be used to treat disease because they are too toxic.

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PUBLIC HEALTH

First Fatal Human Case Of Horse Disease Noted

► THE FIRST human death from the Venezuelan strain of equine encephalomyelitis, popularly known as horse sleeping sickness, is reported by Col. Raymond Randall, V.C., and Capt. John W. Mills, V.C., of the Army Veterinary School at the Army Medical Center. (*Science*, March 17)

The death occurred in the British West Indies last fall during what was apparently the first outbreak of equine encephalomyelitis in Trinidad, B. W. I. Laboratory tests establishing the fact that the human death was due to this disease are now reported. The Trinidad epidemic was among horses and mules.

Only two other human cases of the Venezuelan disease, very mild ones in laboratory personnel working with the virus in the United States, have previously been reported. Outbreaks of equine encephalomyelitis caused by the Eastern and Western strains of the virus have occurred in this country and have caused deaths in the human as well as the horse population. The present studies, the Veterinary Corps officers point out, establish the fact that all three strains of this disease known to be present in the Western Hemisphere can cause fatal encephalitis in man.

Science News Letter, April 1, 1944

PUBLIC HEALTH

Hospital Census Shows Enormous Increase

► AN ALL-TIME record of 15,374,698 patients, exclusive of newborn babies and outpatients, were admitted to hospitals in the U. S. during 1943, the American Medical Association's annual census of hospitals shows.

This figure is an increase of 2,829,088, or 22.5% over the previous year.

Births in hospitals during 1943 totalled 1,924,591.

The number of hospitals increased by 310, while the number of hospital beds increased by 265,427 plus 5,686 more bassinets.

"This recent growth is the equivalent," states the report in the *A.M.A. Journal* (March 25), "of a new 727 bed hospital for each day of the year."

The enormous expansion is due to wartime needs. The largest gain in number of hospitals occurred in the federal group, which would include Army, Navy and Marine or Public Health Service hospitals, and Veterans Administration Facilities. This group now numbers 827, as compared with 474 in 1942, and their bed capacity is given at 476,673, an increase of 255,735 since 1942.

Science News Letter, April 1, 1944

GENERAL SCIENCE

Science Laboratories Get Eased Priorities

► PRIORITIES for science laboratories for facilities for assisting the war effort have now been amended and clarified by the War Production Board. Procedure for obtaining controlled materials is simplified. A new procedure has been set up for obtaining certain essential materials referred to in previous orders as Class A products.

Previous restrictions on the quantity of aluminum that may be obtained are removed. Priorities assistance may be used for laboratory construction jobs costing not more than \$500, the cost of labor and equipment not included. Hand tools and safety equipment bought by a laboratory for resale to its employees may be obtained under the amendments.

Priority ratings assigned by the War Production Board to assist science laboratories may be used to get materials for development of products designed primarily for future civilian markets only if such activities will be carried on without diverting manpower, technical skills, or facilities from war work.

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CHEMISTRY

A New Kingdom From Sawdust

By process introduced in the U. S. by an anti-Nazi German businessman, sawmill wastes can be converted into millions of gallons of war-essential alcohol.

By HOLMAN HARVEY

► NOT LONG ago, Allied production chiefs were pacing the floor, worried over a tough problem. To have plenty of smokeless powder and rubber they needed huge quantities of alcohol. But the production of this alcohol involved the use of vast amounts of grain. And they had already dipped into the world grain bin with such a heavy hand that in America alone all the wheat, corn, barley and rye grown on 10,000,000 acres were going into alcohol distilleries.

From this uneasy future the production chiefs have now been delivered by American chemists, aided unconsciously by a Nazi scientist and, very consciously, by an anti-Nazi German businessman who managed to get out of Germany with only his shirt and some very im-

portant knowledge. The Allies can now get alcohol easily and economically from sawdust, of which there is an unlimited supply.

The experiments that brought sawdust from its age-old obscurity took place on the 13th of last July, when a dozen eminent chemists assembled in a small pilot plant at Marquette, Mich. The demonstration had been arranged by Dr. J. Alfred Hall, principal biochemist of the U. S. Forest Service, acting at the request of the Chemical Referee Board—the government's supreme court in war chemistry. The Forest Products Laboratory at Madison, Wis., provided a crew of chemists to supervise the operations.

Eight hours after the observers had assembled, 500 pounds of ordinary sawdust had been converted before their

eyes into 250 pounds of sugar. The demonstrators didn't bother to convert the sugar into alcohol. It would be mere routine to ferment and distill it, producing 12½ gallons of 190-proof "grain" alcohol in 24 hours.

Translating these pilot-plant figures into terms of tons, you have: Out of one ton of sawdust, a half-ton of sugar; out of the half-ton of sugar, 50 gallons of ethyl alcohol. (This alcohol, though made from wood, is not the poisonous methyl alcohol that is commonly known as "wood alcohol," which is of relatively limited usefulness.)

Pilot Plant Hummed

Day and night for three months after that eventful demonstration the little pilot plant hummed. Truckloads of sawdust from all of the leading lumber areas of the United States were brought in and tested. No "bugs" developed. The average sugar yield was even above expectations. It was found that the softwoods—the cone-bearing evergreens, which total 75% of all American trees—produced 50 to 60 gallons of alcohol to every ton of waste. The hardwoods, or broadleaved trees, gave only 30 to 40 gallons a ton, and therefore will not be used.

There was nothing novel in demonstrating that wood can be made to yield sugar by the application of dilute sulfuric acid under the proper conditions. What the Marquette demonstration proved was that by a German process twice as much sugar can be obtained, at less cost, with simpler equipment, and in less time, than had been possible through any American process. No American process, indeed, had ever been commercially practicable.

Improved Process

The Marquette chemists went on to improve on the German process. What it had taken the German chemists 18 hours to do, the Americans finally accomplished in six hours.

To wage the war during 1944, the United States will need the staggering total of 640,000,000 gallons of ethyl alcohol, which is about five times our usual consumption. Of this, 330,000,000 gallons are earmarked for synthetic rubber. Vast quantities are needed for making explosives, medical supplies, plastics, synthetic textiles. Tens of millions



MOUNTAIN OF WASTE—There are some 20,000 tons of sawdust in this pile at a lumber company in Westwood, Calif. From this amount of sawdust 10,000 tons of wood sugar can be made, which will yield a million gallons of industrial alcohol. The little dark patch just left of center is a man in a bulldozer pushing the sawdust out to the edges.

of gallons are going to the United Kingdom and Russia.

To meet these urgent needs, only 590,000,000 gallons are in sight from present production—a shortage of 50,000,000 gallons.

Tons of Waste

Meanwhile, at the great saw-mill centers of the country, millions upon millions of tons of sawdust burn away in vast pyres. This year our lumber mills will produce 30,000,000 tons of waste. From 12,800,000 tons of it we could obtain all our estimated 1944 military and civilian requirements of alcohol.

Forest Service experts have already approved sites for a frontline battery of 30 conversion plants, with a combined annual alcohol capacity of 150,000,000 gallons. The sites are alongside the great sawdust piles in the Pacific Northwest and the South. At each of these 30 locations, an average of 100,000 tons of wood waste a year is immediately available. The initial plant is to be erected in the heart of Oregon's great Douglas Fir milling area.

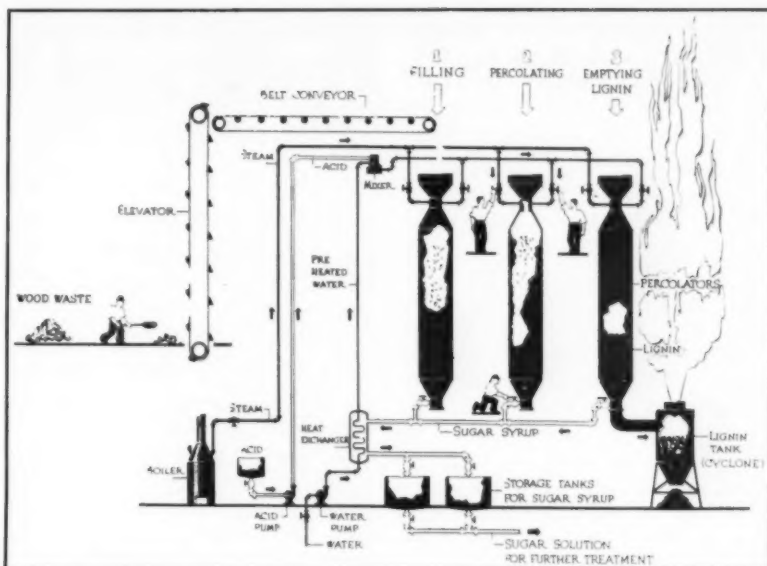
Cost of 30 Plants

The cost of the 30 plants is estimated at \$90,000,000. Operating costs are reduced by using 25% of the waste itself as plant fuel, converting 75%. On a reasonable basis of amortization (10 to 15 years), alcohol could be produced to sell at from 20 to 25 cents a gallon.

For the most part our pre-war industrial alcohol was made from West Indian black-strap molasses and sold for 18 to 25 cents a gallon. The U-boats cut this source of supply—forcing the use of grain. Even with the passing of the U-boat menace the shortage persisted, because the Caribbean countries have begun to process this molasses into rum and gin.

Events Started in 1942

The events which have suddenly catapulted sawdust, an economic waif, into the national spotlight started one afternoon in November, 1942, when a stranger walked into Dr. Hall's office in the Forest Service in Washington. His name was Erwin M. Schaefer. He told Dr. Hall a strange story. In the late '20's a German chemist named Heinrich Scholler had discovered a new process for the rapid conversion of wood waste. To utilize the process, a large chemical concern, *Brennerei und Chemische Werke Tornesch*, erected a wood-sugar plant at Tornesch, near Hamburg. Schaefer was the proprietor of that



HOW IT WORKS—This diagram illustrates how wood waste can be converted into sugar solution, from which alcohol is made, and the by-product, lignin.

plant—until, in 1938, the Nazis took it over. Schaefer and other officials were marched away to a concentration camp. Scholler, an ardent Nazi, had turned informer against his associates.

The Nazis let Schaefer out of the concentration camp after a while, and he left Germany. He had been a millionaire, but when he crossed the border his entire fortune was in his pocket: the \$250 permitted travelers by Nazi regulations.

Arrived in America

In 1941, after much hardship he arrived in America, determined to place his knowledge of large-scale wood-sugar production at the service of the United States. For over a year he knocked on doors, seeking an audience. But he was an enemy alien, speaking broken English, and he met only incredulity and indifference until he talked with Dr. Hall.

Hall plunged into a study of the Scholler process. The country was now at war. Scholler's 12 patents, which had long since been registered in the United States, had been taken over, along with all other German patents, by the U. S. Alien Property Custodian. Hall dug them out.

For months the two men worked together. Then Hall, with his evidence finally in hand, presented the case to the Chemical Referee Board. The Board ordered the tests at Marquette.

In making sugar and alcohol from

sawdust there is an interesting and important by-product. The residue from a ton of sawdust, after it is converted into sugar, is 500 pounds of lignin, a substance that acts in the living tree as a binder for the cellulose cells. Lignin is rich in natural resins and already has been used as a raw material for numerous plastics. Compressed into briquettes, it burns with the same caloric yield as good anthracite coal, and burns without ash. Experimentally it has been used as an "extender" in rubber, as a low-cost soil improver, and in building material. A laboratory devoted to further research into its possibilities has been set up by the lumber industry in Washington, D. C.

Finland's Wood Waste

Heavily forested Finland uses its wood waste to make celluloid, artificial silk, lacquers, unbreakable glass, photographic film and numerous other products. The improved American process is expected to open up similar industrial vistas for the U. S. after the war.

Will you wake up some morning to find sugar made of wood on your breakfast table? The answer seems to be, No. It has three quarters the sweetness of table sugar and is quite nutritious, but it cannot compete in cost with cane or beet sugar.

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Latin American rubber totalling 22,380 tons was imported into the U. S. in 1943.

Do You Know?

The first known *wheeled vehicles* were used in Babylonia about 3000 B.C.

Ice cream production in the United States increased more than 50% from 1936 to 1941.

Cactus species that bloom at night usually have white, scented flowers, while day bloomers usually have flowers of brilliant colors.

Chestnuts may be used for washing clothing, a Netherlands paper says; the kernels are grated and then boiled and mashed through a sieve into warm water for the washing.

Citrus trees are treated with hydrocyanic acid spray one year and with oil spray the next because *parasites* seem to build up resistance to poisons used year after year.

Over 3,000,000 *fish* from federal hatcheries were released in 39 states in farm stock-water and other ponds in 1943; most of them were large mouth black bass and bluegill sunfish.

Oiticica oil, a pale viscous liquid obtained from the seed or nut of the Brazilian oiticica tree, can take the place of tung oil for many purposes; imports from Brazil are increasing.

Defatted *corn germ*, now coming into production as a new human food as rich in proteins as beef, is made from the small yellow nuggets in the corn kernel by extracting the corn oil.

Lecithin, a colorless viscous phosphorized fat produced by animals and plants, is used in the food and confectionery industries as an emulsifier or dispersing agent; it protects freshness.

Wood, impregnated with the components of certain synthetic resins and subjected to heat, becomes plastic and while the resin is being formed can be compressed to one-third the original volume.

Shoe production in the United States in 1943 dropped less than 5% from the 1942 amount; over 10% of the 1943 production consisted of military shoes and approximately 8.5% were non-ration types.

PHYSICS

Theory of Gravitation

Electromagnetic space-time forms basis of hypothesis recently advanced by Harvard mathematician, working with scientists in Mexico City.

► A THEORY of matter, electricity and gravitation, based on electromagnetic space-time has been recently advanced by Dr. George D. Birkhoff, Harvard University mathematician, who is spending several months in Mexico City.

Built upon the electromagnetic framework of the special theory of relativity, Dr. Birkhoff uses one dimension of time and three of space to express his equations. No difficulty is encountered in incorporating electromagnetic as well as gravitational forces in the new theory.

The electrical charge is thought of as invariably attached to the "perfect fluid" which he uses as a model. This perfect fluid is one in which the velocity at which a disturbance moves exactly equals that of light, Dr. Birkhoff states. It is conceived of as only filling part of electromagnetic space-time and as being mobile and dynamic. From a mathematical point of view the fluid has been found to be a satisfactory form of matter.

Dr. Birkhoff's gravitational theory, based on the perfect fluid projected against the flat space-time of the special theory of relativity, grew out of a request from his Mexican colleagues that he present a paper at the Astrophysical Congress held in Mexico in 1942. Since his arrival in Mexico he has been collaborating intensively with Professors Manuel Sandoval Vallarta, Carlos Graef and Alberto Barajas of the National University of Mexico, and further significant progress has been made.

The photon has turned out to play a natural role in the theory; and the fundamental problem of two or more bodies has proved to be amenable to direct attack, because of the simplicity of the

equations involved. Other important problems, such as the unexplained irregularities of the motion of the moon are, also, being studied in the light of Dr. Birkhoff's theory.

Not only is the theory in perfect accord with ordinary gravitational phenomena, but it explains in another way the three most delicate effects of the famous Einstein theory of 1916. While the new theory presupposes an absolute reference system of space-time similar to that of Newton, but of an electromagnetic nature, Einstein's theory presupposes a curved space-time, changing at every moment.

Physical theories of relativistic type are likely to be of use for theoretical astronomy only in cases when large velocities enter and the minute gravitational effects involved can be observed. It seems probable, however, that they may be important in the domain of atomic physics.

Such relativistic theories seem more in accord with the electromagnetic structure of matter than does the theory of Newton, Dr. Birkhoff says.

New theories of universal gravitation, suggested by modern developments in electromagnetism and modern mathematical formalism, deserve much more serious attention than they have yet received, since they are still in the formative stage, the Harvard mathematician believes. It was Dr. Birkhoff who only a few years ago urged scientists to consider more seriously Einstein's special and general theories of relativity in relation to quantum mechanics.

Science News Letter, April 1, 1944

NUTRITION

Proteins To Rehabilitate

► PROTEINS, the tissue-building foods, must receive first consideration in arranging for the feeding of the half-starved peoples in liberated but looted countries, as the Nazis are thrown out, Prof. Paul R. Cannon of the University of Chicago emphasized in an

address before a Washington meeting of the Food Forum.

Giving hungry people what have been lightly called "energy foods" isn't enough, Prof. Cannon insisted. Though the cry may be for bread, bread alone will not save the starving. And vitamins,



TIED UP—Soldiers who become sailors and stevedores at the Army's Port Battalion Training School at Charleston, S. C., learn to tie knots by risking their limbs on ropes they lash together on 20-foot towers. The men belong to units of the Army Transportation Corps, which mans invasion barges and cargo carrying boats, and loads and unloads the Army's supplies and men at ports in theaters of operations. Official U. S. Signal Corps photograph.

though also necessary, do not in themselves make good the lack. To carbohydrates, fats, vitamins and minerals must be added proteins—and high-grade proteins at that.

The reason is, the speaker explained, that proteins are not only muscle-building foods, as they are often described; they are necessary for the formation of blood cells both red and white, of the vital gland secretions, of digestive enzymes, and particularly of the protective substances in the blood that neutralize the effects of bacterial attacks. Failure of the body to produce these necessary substances because of protein starvation helps to explain why pestilence follows so closely on the heels of famine and war.

Nor will just "any old protein" do for meeting war-nutrition emergencies, Prof. Cannon continued. Proteins are exceedingly complex compounds, each made up of a number of distinct molecular groups known as amino acids. Of the score or so of known amino acids, eight are considered essential; and relatively few common proteins can supply all of these. Of vegetable proteins, soybeans are probably the best for making

good the lack of the three chief animal protein foods (meat, eggs, cheese), with skim milk powder, peanut and cottonseed flours and corn germ also highly useful. Addition of these to flour, soup mixes and "pasti" will go far toward sustaining the health of liberated populations until they can get on their own feet again.

Science News Letter, April 1, 1944

U. S. "Shortages"

➤ AMERICANS who exercise their natural right to grumble don't know anything about real food shortages, Lee Marshall, Director of Food Distribution, suggested in his address. If we haven't enough of one thing, we can turn to something else. In most of Europe, there simply isn't enough of anything at all.

"I am sure that if we talked to some of the conquered people of Europe about our shortages," he said, "they would look at us in amazement. They probably would ask, 'What shortages?'"

But even on the basis of what we ourselves are used to, we are still above par, nutritionally, the speaker insisted: "American civilians today are enjoying

greater per-capita supplies of food than they did during the 1935-39 period—the so-called surplus years. With a large part of the population employed, and with a rationing system in effect, the food supply is probably better distributed than ever before."

Of total food supplies in sight, the allocations for the current year, according to Mr. Marshall, are: 75% to the civilian population, 13% to the American armed forces, 8% in lend-lease, chiefly to Britain and Russia, 3% for emergency requirements in liberated areas and other special purposes, 1% to United States territories and to other uses.

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ENGINEERING

High-Frequency Current Used for Dehydration

➤ A FEW years ago, it was noted in laboratory experiments on insects that exposure to intense fields of high-frequency waves not only killed them but dried them out. This principle is now put to practical use in an invention on which Alfred Vang of Newark, N. J., has been granted patent 2,344,754.

Peas, diced vegetables, or other food materials to be dehydrated are placed in a closed container, with 'mechanical means for keeping them well stirred. High-voltage, high-frequency current is generated on the outside of the container. The eddy currents induced within the tissues rapidly dehydrate them to the desired point.

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SCIENCE INFORMATION

for Members of the
Armed Forces OVERSEAS

IN order to serve the armed forces, Science News Letter recently offered its new monthly Overseas Edition to men and women outside the United States.

This special edition is geared to the armed forces—it contains scientific information interesting and useful to them. News important to us here, but not to them there, is cut out in order to pack the Overseas Science News Letter with the science information of greatest interest and use to members of our armed forces Overseas.

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MEDICINE

Search for Filariasis Cure

➤ SEARCH for a chemical cure for filariasis, worm-caused disease that has attacked some American troops in the tropics, can be helped by Florida cotton rats which are a convenient animal for testing possible anti-filariasis drugs, Prof. James T. Culbertson and Dr. Harry M. Rose, of the College of Physicians and Surgeons, Columbia University, report. (*Science*, March 24)

The rats have already pointed to one drug as worthy of trial in human cases, the Columbia scientists report. The drug is called neostam or stibamine glucoside and is a pentavalent antimony com-

pound that has been used to treat another tropical disease, kala-azar.

"Repeated injection of neostam has resulted in the cure of filariasis in the cotton rat," the scientists state.

If further trials of the drug succeed in curing the disease in humans, it will come as an agreeable surprise to many specialists in tropical medicine. Pentavalent antimony compounds, although valuable in certain protozoal infections, have not heretofore shown promise against the worm-caused disease, filariasis.

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GEOLOGY

South American Oil

➤ A VAST untapped region extending the whole length of South America promises rich oil reserves, Dr. John L. Rich of the University of Cincinnati reported before the American Association of Petroleum Geologists' annual convention in Dallas.

A belt bordering the eastern base of the Andes mountain system from Tierra del Fuego to the island of Trinidad is the area which Dr. Rich forecasts will be oil-productive. The belt is now productive in the Neuquen, Mendoza, and Salta regions of Argentina, in southern Bolivia, in central Peru, and in Venezuela, Dr. Rich revealed.

Though much of the sub-Andean belt is geologically favorable for the generation and accumulation of oil, the finding and development of that oil promises to be more than ordinarily difficult, Dr. Rich warned.

"In much of the belt, except locally close along the mountain base, the prospective oil-bearing rocks lie at great depths, ranging up to 15,000 feet or more, and the structures will be difficult to find owing to a thick mantle of comparatively recent gravels, sands and silts spread eastward from the growing Andes, unconformably burying the older rocks."

Transportation of the oil to market is another obstacle cited by Dr. Rich: "Some 1,600 miles of the sub-Andean belt, from central Bolivia to the Llanos of central Colombia, is an unbroken tropical rain forest where the heat and humidity are trying and where the presence of tropical diseases will re-

quire the utmost vigilance. Transportation in the region is not yet developed, and at best the distance to markets is very great."

According to Dr. Rich, one of the largest areas of potential oil territory, not yet productive, is the huge Parana Basin region of southwestern Brazil, Paraguay, and northern Uruguay, where good showings of oil have been found in test wells.

"But most of the basin is covered by an enormous lava field which makes prospecting extraordinarily difficult," Dr. Rich says.

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ORDNANCE

Simple Oxygen Helmet Invented for Flyers

➤ A SIMPLE oxygen helmet for flyers is the subject of patent 2,344,718, obtained by S. A. Morehouse of Glendale, Calif. Instead of having the pressure-reducing bag in an awkward position on the wearer's chest, it incorporates it into the structure of the helmet fitting over the flyer's head, with the intake tube from the supply tank coming up behind his seat and hence wholly out of the way.

Science News Letter, April 1, 1944

Among the *scarcest articles* in the Netherlands are ordinary straight pins.

Mice have been taught to distinguish between two musical notes, one of which is associated with the appearance of food.



Neutralized Ogre

► THE HOUSEFLY had a relatively short career as a recognized menace to the health and efficiency of armies. During our brief war with Spain, in 1898, typhoid fever was a terrible scourge among our green troops living under canvas. There were far more deaths from this one disease in camps in our southern states than there were from enemy bullets in Cuba. Men died like flies, the newspaper editorials lamented: it was not suspected, except perhaps by a few more advanced physicians, that they were dying because of flies.

Crude attempts at camp sanitation were the means of putting the housefly on the spot, with damning evidence against him. In the relatively primitive camp set-ups of those days, kitchens and mess-halls were unscreened, and flies flew in by millions and crawled over the food. Except that it was a nuisance, nobody minded much; flies were so commonly regarded as harmless that in "Baby Bye," a contemporary nursery jingle, there is mention of flies "walking on eggs."

In some of the most typhoid-ridden camps it was noticed that many of the

flies swarming over the troops' food had white stuff on their feet. It was quickly realized that this was lime, and that it could only have come from the latrine pits. This was more than a little disgusting in itself, but when the suspicion was raised and rather quickly confirmed, that the flies were carrying typhoid germs on their feet and mouthparts, it brought the medical profession and the better informed lay public up in arms against these buzzing messengers of death.

The Spanish-American war was too brief for much practical application to be made of the new knowledge of the peril that lay in permitting the fly to continue with a free hand (or rather, with six free feet) along his filthy way. A vigorous anti-fly campaign was launched over the country at large. It was proposed to rename the insect "typhoid fly" instead of his earlier innocuous title of "housefly." Screens for houses and porches, as well as for less formal structures like constructors'

shacks and summer cabins, became increasingly common. Quick disposal of garbage and stable litter came to be the rule.

Several new industrial and merchandising developments aided indirectly in the abatement of the fly menace. Sale of many kinds of food in sealed packages replaced bulk sales from open containers. Pasteurization and bottling of milk became general, even in small communities. In cities at least, horses virtually disappeared as the motor car age developed.

At the same time, medical research produced and perfected the anti-typhoid "shots," which have an impregnable line of defense against the fever that was once the Army's worst scourge. Fly and germ have been beaten together.

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Pottery in everyday use in parts of Mexico is almost identical with that made and used by local Indians before the days of the Conquest.

Books of the Week

► DESIGNED to make the transition from classroom to the bridge of a ship less difficult, AN INTRODUCTION TO NAVIGATION AND NAUTICAL ASTRONOMY by William George Shute, William Wright Shirk, George Forber Porter and Courtney Hemenway (Macmillan, \$4.50) presents the foundation material by easy stages. Crammed with illustrations and charts, the introductory text requires no supplementary books, tables, almanacs or work sheets.

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Just Off the Press

THE AMERICAN WAY: Selections From the Public Addresses and Papers of Franklin D. Roosevelt—Dagobert D. Runes, ed.—Phil. Library, 71 p., \$1.50.

THE CHEMISTRY OF CELLULOSE—Emil Heuser—Wiley, 660 p., illus., \$7.50.

THE COAL INDUSTRY—Josephine Perry—Longmans, Green, 128 p., illus., \$1.75.

THE ENEMIES' FIGHTING SHIPS—Jay Launer—Sheridan House, 222 p., illus., \$3.75.

ESSENTIALS OF ASTRONOMY—John Charles Duncan—Harper, 181 p., illus., \$1.85.

THE HIKER'S HANDBOOK—Douglas Leechman—Norton, 220 p., illus., \$2.50.

LECTURES ON THE INORGANIC NUTRITION OF PLANTS—D. R. Hoagland—Chronica Botanica, 226 p., illus., \$4.

MANKIND SO FAR—William Howells—Doubleday, Doran, 319 p., illus., \$4.50.

MEDICAL PHYSICS—Otto Glasser, Ed.—Year Book, 1744 p., illus., \$20.

NEW GOALS FOR OLD AGE—George Law-

ton, ed.—Col. Univ. Press, 210 p., \$2.75.
THE PRACTICE OF IDEALISM—Alfred M. Bingham—Duell, Sloan and Pearce, 196 p., \$2.
SCIENCE YEAR BOOK OF 1944—John D. Ratcliff—Doubleday, Doran, 218 p., \$2.50.
YOUR WORLD TOMORROW—Donald G. Cooley and others—Duell, Sloan & Pearce, 252 p., illus., \$2.50.

The book of the greatest year of scientific achievement in history! . . . Radar . . . penicillin . . . the helicopter . . . artificial insemination . . . the house of tomorrow . . . and 24 other scientific marvels . . . fully described in this authoritative book—third of a series.

Science
YEAR BOOK OF 1944
by John D. Ratcliff

At your bookseller's • \$2.50 • DOUBLEDAY, DORAN

ELECTROMAGNETISM

This is the sixth supplement to *Essays on the New Vortex Atom*. The five previous supplements dealt with the Carbon Atom, Heavier Elements, Miscellaneous Structures, Periodic Table, and Gravitation. Any or all of these may be obtained free of charge.

The physics textbooks give us formulas and equations for expressing the facts of electromagnetism in mathematical language, but leave us in the dark as to reasons or explanations. All previously attempted explanations break down at one point or another. The new explanation presented in this pamphlet is based on the ether-vortex concept and seems to be free from inherent difficulties or contradictions.

C. F. Krafft

1322 Amherst Ave. Richmond 22, Va.

• New Machines and Gadgets •

✿ **CONCUSSION** hand grenades for use against the Nazis are molded in seven parts of two types of phenolic black plastic materials. The parts are threaded to hold them together. The grenades explode immediately upon striking.

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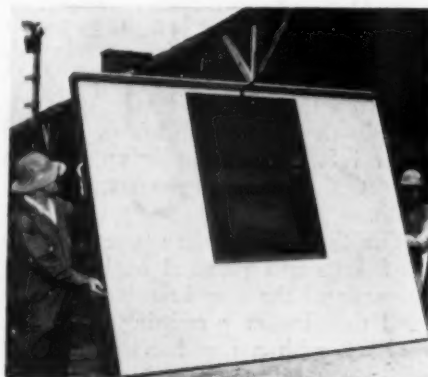
✿ **PORTABLE** wire-cutters for relatively heavy wire, recently patented, look like a light monkey wrench, but with the addition of a fixed and movable handle. The outer jaw has a hooked fixed cutter. The inner cutting jaw is operated by the movable handle grasped just as ordinary pliers are grasped and squeezed.

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✿ **ELECTROLYTIC** polishing of metal surfaces, a relatively new process, gives mirror-like faces more quickly and efficiently than is obtained by mechanical buffing and hand operation. In effect, ridges and imperfections are dissolved away.

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✿ **PREFABRICATED** Army barracks large enough to house 48 men may be erected in the field in 90 minutes without special tools. They have raised floors and insulated walls and roof. Windows are made of a translucent plastic which



admits ultraviolet rays. A section as shipped is shown in the picture.

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✿ **GALLEY KITS** for airplanes developed by the Army include two compact ovens electrically heated from the aircraft's electrical system. One is designed to cook food while in flight, the other to keep pre-cooked food hot enough to eat.

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✿ **A SEMI-QUILTED PAD** containing a drying and absorbing material will clean oil from arms and hands quickly and thoroughly. When applied, it leaves a fine coating of powder on the skin which absorbs the oil and is then brushed off.

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✿ **DAINTY** lingerie may be washed without wetting the hands in a small patented washing machine. The bucket suds-container has a top with a center hole through which passes a straight handle with a corded bag on its lower end. Articles in the loose bag are splashed up and down until washed.

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✿ **LABORATORY** pipettes, used to transfer small, carefully measured quantities of chemical solutions, will be found easier to use with a newly patented attachment. The rubber suction bulb on the pipette is enclosed in a rigid bulb, and is collapsed accurately to the desired extent with a thumb screw.

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 201.

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